Small Business Innovation Research/Small Business Tech Transfer

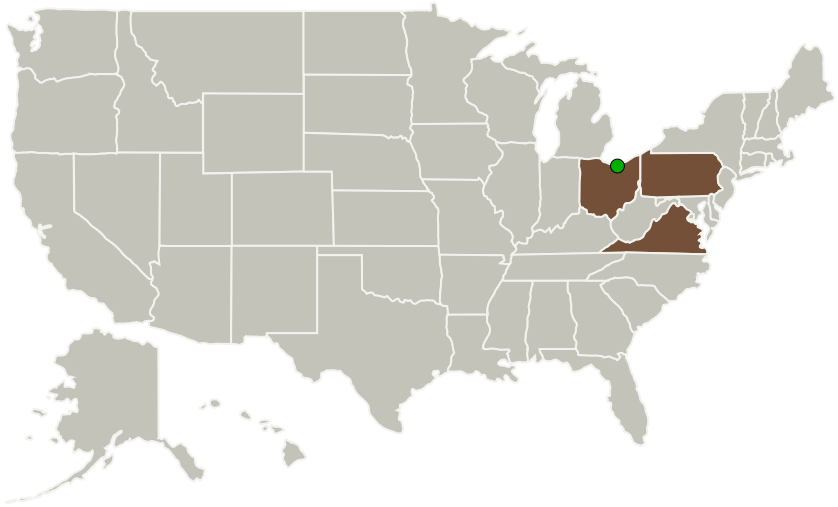
Advanced Deposition Capability for Oxidation & Corrosion Protection Coatings, Phase II

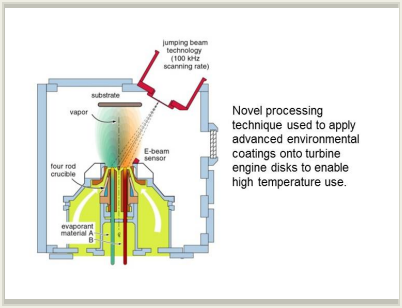
Completed Technology Project (2014 - 2017)

Project Introduction

NASA's long range goals of reducing fuel consumption by 30% and increasing fuel efficiency by 35% can be partially accomplished through increasing the operation temperatures of gas turbine engines. The advent of advanced alloys, coatings, cooling technologies and ceramic components has created the potential for significant increases in the hot section of these engines; however, these advances will also lead to elevated temperatures in other regions of the engine. For example, the turbine disk section would also need to operate at increasingly higher temperatures that would subject it to oxidation and hot corrosion degradation mechanisms not currently experienced. One approach to enhance the temperature capability of these systems is through the incorporation of environmental protective coatings. Research is proposed here to employ advanced coating manufacturing techniques designed to enable the affordable application of environmental protective coatings having enhanced resistance to hot corrosion and oxidation. Advanced testing approaches will be used that simulate real-world conditions and demonstrate the performance advantages of the deposited coatings. The coating systems will be applied in this work onto coupons and components to demonstrate coating capability and allow simulated engine environment testing in follow-on programs.

Primary U.S. Work Locations and Key Partners





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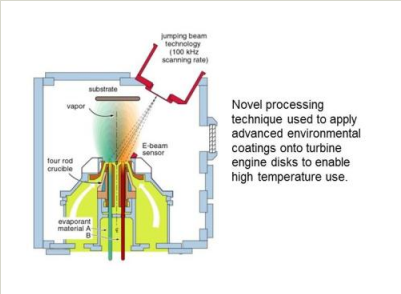
Organizations Performing Work	Role	Type	Location
Directed Vapor Technologies International, Inc	Lead Organization	Industry	Charlottesville, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
University of Pittsburgh-Pittsburgh Campus	Supporting Organization	Academia	Pittsburgh, Pennsylvania

Primary U.S. Work Locations	
Ohio	Pennsylvania
Virginia	

Images



Briefing Chart Image
Advanced Deposition Capability for Oxidation & Corrosion Protection Coatings, Phase II
(https://techport.nasa.gov/image/128175)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Directed Vapor Technologies International, Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Derek Hass

Co-Investigator:
Derek Hass

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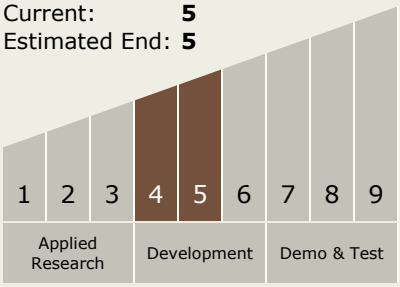
Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.5 Coatings

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System